

A Safer and More Efficient Airspace

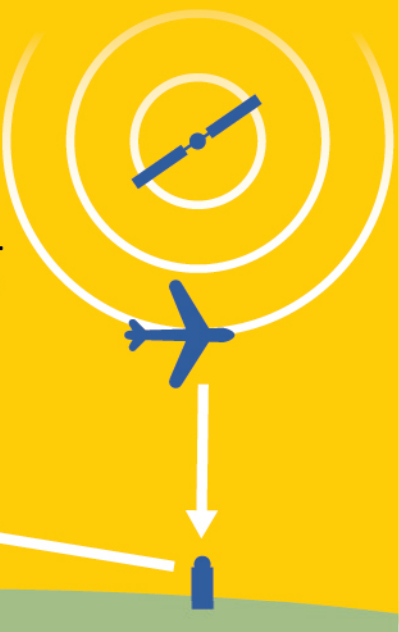
Automatic Dependent Surveillance-Broadcast

The **FAA's** Next-Generation Air Transportation System—NextGen—is transforming how air traffic controllers and pilots see our national airspace. By 2020, NextGen will make America's skies even safer and more efficient by transitioning from radar technology to a far more precise global satellite network. The backbone of this evolution is a technology called Automatic Dependent Surveillance-Broadcast (ADS-B), which **Volpe, The National Transportation Systems Center**, has helped FAA develop and deploy for more than a decade.

ADS-B and other NextGen advances represent a widespread, transformative change in the management and operation of how we fly. When fully deployed, ADS-B will save time and money for air travelers and carriers, and will prevent thousands of pounds of carbon from being released.

How ADS-B Works

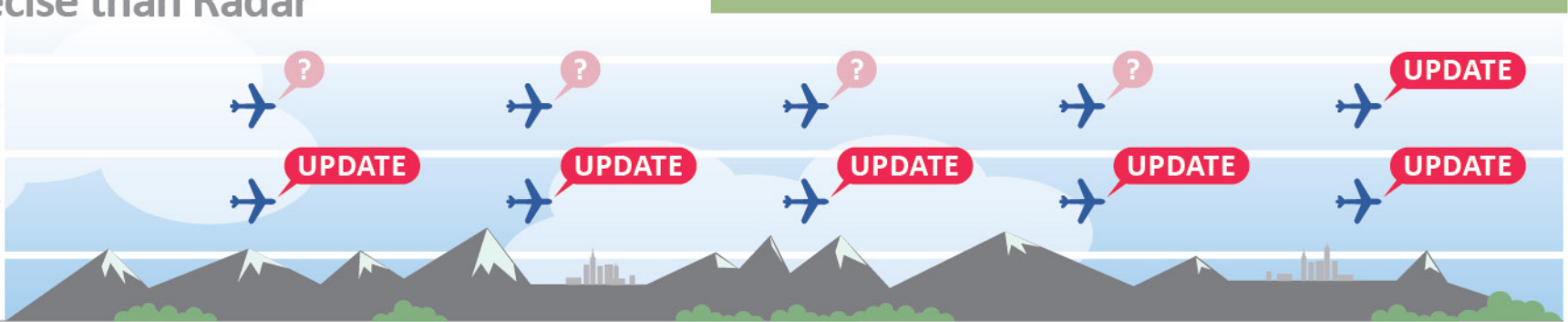
ADS-B combines Global Positioning System (GPS) data with aircraft identification and altitude information. Avionics broadcast that information to ground stations that relay it to ground controllers. The information is highly accurate and fast.



ADS-B is More Precise than Radar

Radar
5- to 12-second updates

ADS-B
1-second updates



ADS-B Out

Mandated by 2020 in our busiest airspace

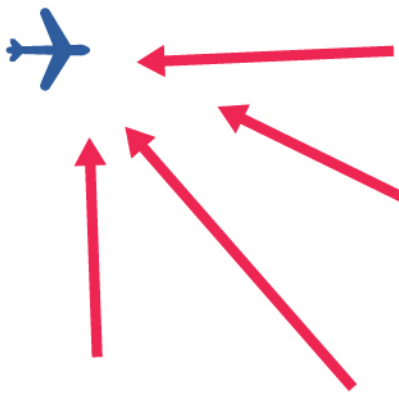
Uses GPS technology to determine aircraft location and speed. Information is automatically sent to a network of ground stations. For the general aviation community, the avionics for ADS-B Out are low-cost and easy to install.



ADS-B In

Optional

A receiver, display device, and transmitter deliver information directly to the cockpit. Pilots benefit from unprecedented situational awareness, with updates on where other planes are, weather conditions, flight restrictions, winds and temperatures, and other data—completely independent of air traffic controllers.

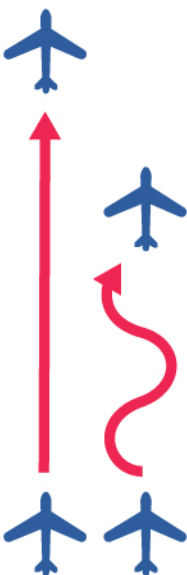


Benefits

ON TIME
ON TIME
ON TIME
ARRIVED
NOW BOARDING
NOW BOARDING
NOW BOARDING

Efficiency

With ADS-B, commercial air carriers **reduce flight times and delays**. Airplanes can fly closer together. Flights taking off in low-visibility conditions that may have been delayed or canceled using radar can now depart on time.



Fuel Economy

Airplanes using ADS-B **burn less fuel and emit fewer pollutants**. Precise geolocation with ADS-B lets pilots safely maintain more direct routes, even during severe weather.



Safety

We now have ADS-B coverage in remote areas where radar coverage was limited, such as the Gulf of Mexico, mountains in Colorado, and low-altitude airspace in Alaska. **Improved situational awareness** is increasingly important as our airspace becomes more crowded. ADS-B precision also helps take the “search” out of life-saving search-and-rescue operations.

Volpe's Role

Volpe provided technical expertise and guidance to help FAA create ADS-B



Feasibility

There was one unanswered, critical question as ADS-B was being developed: how did ADS-B stack up against radar? Volpe and FAA visited dozens of ADS-B transceiver sites to test the system's accuracy against radar. ADS-B was much more accurate in showing air traffic controllers real-time aircraft positions.



Simulations

Various radio systems must work on the same frequency while avoiding signal degradation. Volpe developed a simulator that estimated the future frequency environment, based on stakeholder plans for future capabilities and existing systems. Modeling and simulating the interactions between aeronautical radio systems were essential steps in developing ADS-B and support the safe operation of our aviation system.



Pre-Flight Planning Tool

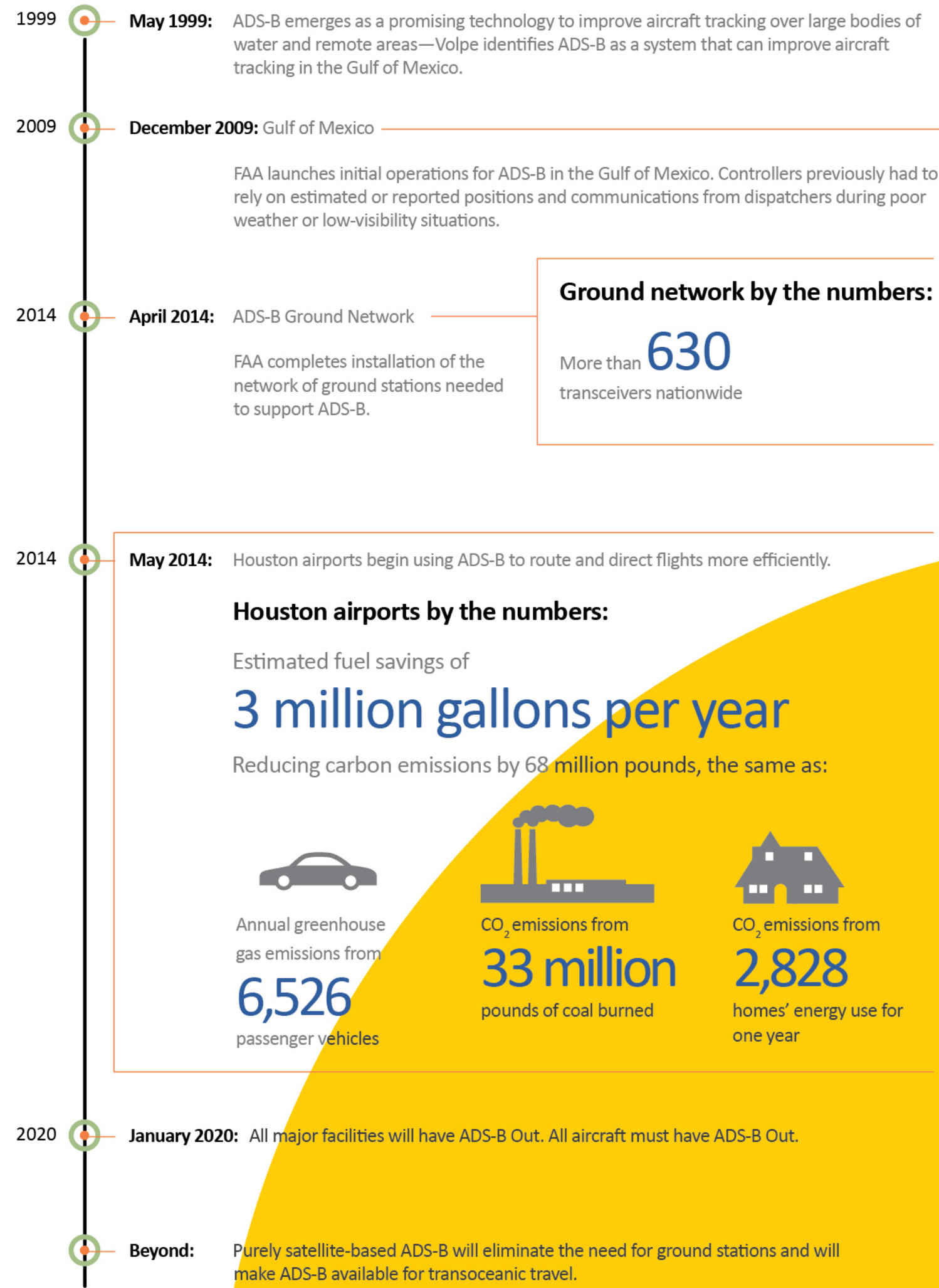
Volpe created the ADS-B Service Availability Prediction Tool (SAPT), which models the GPS constellation, including satellite outages, matches these outages to a proposed flight plan, and predicts whether navigation equipment performance will meet the performance standard for airspace required to use ADS-B.



Project Management

Volpe engineers help FAA organize data and stay on schedule as the agency deploys ADS-B.

ADS-B Timeline of Achievements



The Gulf by the numbers:

3,800
oil and natural gas platforms

5,000 to 9,000
helicopter flights daily

Up to **10,000**
people, with supplies and equipment transported daily

24 times better

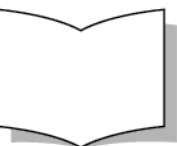
Commercial aircraft can achieve 5-mile separation, compared to 120-mile separation before ADS-B.

This has resulted in direct routing clearances, shortened trips, and fuel savings.

120 miles

Volpe has contributed to nearly **40 publications** on ADS-B.

Contact the Volpe library at
<http://www.volpe.dot.gov/library>



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